

fixed distance, said fibers having substantially the same length and from at least 0.1% greater, to about 5% greater than said fixed distance, a transmembrane pressure differential in the range from about 0.7 kPa (0.1 psi) to about 345 kPa (50 psi), and length sufficiently greater than the direct distance between opposed faces of said first and second headers, so as to present said skein in a swayable configuration above a horizontal plane through the horizontal center-line of said lower header;

mounting said headers in fluid-tight open communication with collection means to collect said permeate;

(b) flowing a fiber-cleaning gas through a gas-distribution means proximately disposed relative to said skein, within a zone beneath said skein, and contacting surfaces of said fibers with sufficient physical impact of bubbles of said gas to maintain essentially the entire length of each fibers in said skein awash with bubbles and essentially free from said build-up;

maintaining an essentially constant flux through said fibers substantially the same as an equilibrium flux initially obtained after commencing operation of said process;

collecting said permeate in said collection means; and, withdrawing said permeate,

the improvement comprising,

introducing said cleansing gas between said fibers within said skein to generate a column of said bubbles alongside and in contact with outer surfaces of said fibers; said fibers spaced apart by a flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely spaced-apart relationship;

restricting movement of said fibers to said vertical zone defined by lateral movement of outer fibers in said skein;

vertically gas-scrubbing said fibers outside surfaces with bubbles which flow upward in contact with said surfaces;

B1 maintaining said surfaces substantially free from said deposits of particulate matter during a period when flux through said fibers has attained equilibrium; and simultaneously, essentially continuously, withdrawing said permeate.

15. (Twice Amended) A system for treating a multicomponent liquid substrate while leaving particulate matter therein, comprising,

(a) a non-pressurized reservoir other than a shell of a module for containing the substrate;

B2 (b) a cylindrical skein of hollow fiber filtering membranes immersed in the substrate each fiber having a length greater than 0.5 m, the fibers together providing a surface area of at least greater than 1 m² and disposed generally vertically between upper and lower cylindrical headers with (i) the headers having opposed terminal end portions of each fiber sealingly secured therein, the fibers being spaced apart from each other by one or more potting materials located between adjacent fibers, (ii) lumens of said fibers being in fluid communication with at least one permeate collection means, and, (iii) said fibers having a length between opposed surfaces of the headers, in the range from 0.1% to 5% greater than the distance between opposed surfaces of the headers;

(c) a pump in fluid communication with said lumens of said membranes through at least one permeate collection means, said pump operable to apply a suction to the lumens of the membranes to draw a component of the substrate as permeate through said membranes while leaving particulate matter in said substrate; and,

(d) aeration means having through-passages with openings, distributed both radially and circumferentially within the skein for discharging air directly into the substrate near the base of the skein, the openings providing a column of bubbles rising from near the base of the skein.

19. (New) The system of claim 15 wherein the fibers are spaced apart from each other by a center to center distance of at least 1.2 times the outside diameter of the fibers.

20. (New) The system of claim 19 wherein the one or more potting materials comprise a potting resin.

21. (New) The system of claim 15 wherein each said header has said fibers spaced apart by a flexible support means having a thickness corresponding to a desired lateral spacing between adjacent fibers, said support means extending over only each terminal portion of said fibers near their ends, so as to maintain said ends in closely-spaced apart relationship.

22. (New) The system of claim 21 wherein the flexible support means is a potting resin.